Express Mail Label No. Dated: _____

Docket No.: 03282/100L581-US2
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Hans-Joerg Voegel

Application No.: 10/801,926 Confirmation No.: 2329

Filed: March 15, 2004 Art Unit: N/A

For: METHOD AND SYSTEM FOR DELIVERING CONTENT OVER A NETWORK Examiner: Not Yet Assigned

PETITION FOR THE GRANTING OF A FILING DATE FOR A NON-PROVISIONAL APPLICATION UNDER 37 C.F.R. § 1.182

MS Petition
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Applicants hereby petition under 37 C.F.R. §1.182 that the above-identified non-provisional application be accorded the filing date on which the papers therefore were deposited with the U.S. Postal Service "Express Mail Post Office to Addressee" service using mailing label EL983946111US on March 15, 2004.

Applicants submit this Petition after receipt of a Notice to File Missing Parts Non-Provisional Application, mailed by the USPTO on June 3, 2004, indicating that the application was deposited without pages 4, and 18-21 of the specification. A copy of the Notice is appended hereto as Exhibit A. As will be unequivocally established herewith, the application was filed on December 30, 2002 with all requisite documents, including the pages 4, 18-21 of the specification stated to have been missing.

On March 15, 2004, a Non-Provisional Application Cover Sheet marked Attorney Docket No. 03282/100L581-US2 (2 pages), a non-provisional application (24 pages), 13 Drawing sheets (Figs. 1-8, 9A-9B, 10-12), and a postcard (marked Attorney Docket No. 03282/100L581-US2) by which the USPTO could acknowledge receipt, were mailed to the U.S. Patent and Trademark Office by Express Mail under the "Express Mail Post Office to Addressee" service of the U.S. Postal Service. The Transmittal Letter contained an Express Mail Certificate which indicated that all referenced papers were forwarded to the PTO by Express Mail under Express Mail mailing label no. EL983946111US. A copy of all documents mailed on March 15, 2004 is attached at Exhibit B.

Attached at Exhibit C is a copy of the U.S. Post Office Express Mail mailing label bearing no. EL983946111US. The post office date-in stamp correctly indicates March 15, 2004 as the correct filing date.

Attached at Exhibit D is a copy of the return postcard by the USPTO acknowledging the receipt of the items indicated on the postcard.

The enclosed copies of the listed correspondence and the copy of the Express Mail mailing label containing the March 15, 2004 "date-in" notation entered thereon by the U.S. Postal Service are true copies of the respective documents originally deposited.

This petition was filed promptly after receipt of the Notice at Exhibit A. As noted above, the number of the Express Mail mailing label was placed on the application transmittal paper. The Petition includes a copy of the originally deposited papers.

In view of the foregoing, it is respectfully submitted that the above-identified application in its entirety was filed on March 15, 2004. Accordingly, the Commissioner is respectfully requested to accord the filing date on which the subject application papers were deposited by Express Mail.

Applicants submit herewith the petition fee of $130.00 pursuant to 37 C.F.R. 1.17(h). However, applicants hereby request a refund of the petition fee as the application is entitled to the filing date of March 15, 2004.

Dated: August 3, 2004

Respectfully submitted,

By _____

Alphonso A. Collins
Registration No.: 43,559
DARBY & DARBY P.C.
P.O. Box 5257
New York, New York 10150-5257
(212) 527-7700
(212) 753-6237 (Fax)
Attorneys/Agents For Applicant

PLEASE CHARGE ANY DEFICIENCY
OR EXCESS IN THE ABOVE FEE
TO OUR DEPOSIT ACCOUNT UP TO $500.00
04-0100

8-04-04

IFW

Alphonso A. Collins

OIPE AUG 03 2004 JC185 PATENT & TRADEMARK OFFICE

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
10/801,926	03/15/2004	Hans-Joerg Voegel	03282/100L581-US2

File Petition

07278
DARBY & DARBY P.C.
P. O. BOX 5257
NEW YORK, NY 10150-5257

DUE: AUGUST 3, 2004
Docketed on 6/10 by DP for
Docketed without file ☐
Attorney

CONFIRMATION NO. 2329
FORMALITIES LETTER
OC000000012859962

Date Mailed: 06/03/2004

1-3-05

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
  Applicant must submit $ **385** *to complete the basic filing fee for a small entity.*
- The oath or declaration is missing.
  A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(e) of $65 for a small entity in compliance with 37 CFR 1.27, must be submitted with the missing items identified in this letter.

The following item(s) appear to have been **omitted** from the application:

- Page(s) **4,18-21** of the specification (description and claims).

I. Should applicant contend that the above-noted omitted item(s) was in fact deposited in the U.S. Patent and Trademark Office (USPTO) with the nonprovisional application papers, a copy of this Notice and a petition (and $130.00 petition fee *(37 CFR 1.17(h))*) with evidence of such deposit **must** be filed within **TWO MONTHS** of the date of this Notice. The petition fee will be refunded if is determined that the item(s) was received by the USPTO.

II. Should applicant desire to supply the omitted item(s) and accept the date that such omitted item(s) was filed in the USPTO as the filing date of the above-identified application, a copy of this Notice, the omitted item(s) (with a supplemental oath or declaration in compliance with 37 CFR 1.63 and 1.64 referring to such items), and a petition under 37 CFR 1.182 (with the $130.00 petition fee *(37 CFR 1.17(h))* requesting the later filing date **must** be filed within **TWO MONTHS** of the date of this Notice.

Applicant is advised that generally the filing fee required for an application is the filing fee in effect on the filing

date accorded the application and that payment of the requisite basic filing fee on a date later than the filing date of the application requires payment of a surcharge (37 CFR 1.16(e)). To avoid processing delays and payment of a surcharge, applicant should submit any balance due for the requisite filing fee based on the later filing date being requested when submitting the omitted items(s) and the petition (and petition fee) requesting the later filing date.

III. The failure to file a petition (and petition fee) under the above options (I) or (II) within **TWO MONTHS** of the date of this Notice (37 CFR 1.181(f)) will be treated as a constructive acceptance by the applicant of the application as deposited in the USPTO. **THIS TWO MONTH PERIOD IS NOT EXTENDABLE UNDER 37 CFR 1.136(a) or (b)**. In the absence of a timely filed petition in reply to this Notice, the application will maintain a filing date as of the date of deposit of the application papers in the USPTO, and original application papers (*i.e.*, the original disclosure of the invention) will include only those application papers present in the USPTO on the date of deposit.

In the event that applicant elects not to take action pursuant to options (I) or (II) above (thereby constructively electing option (III)), amendment of the specification to renumber the pages consecutively and cancel incomplete sentences caused by any omitted page(s), and/or amendment of the specification to cancel all references to any omitted drawing(s), relabel the drawing figures to be numbered consecutively (if necessary), and correct the references in the specification to the drawing figures to correspond with any relabeled drawing figures, is required. A copy of the drawing figures showing the proposed changes in red ink should accompany with any drawing changes . Such amendment and/or correction to the drawing figures, if necessary, should be by way of preliminary amendment submitted prior to the first Office action to avoid delays in the prosecution of the application.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **$450** for a Small Entity

- **$385** Statutory basic filing fee.
- **$65** Late oath or declaration Surcharge.

Replies should be mailed to: Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

A copy of this notice MUST be returned with the reply.

M. Mo

Customer Service Center
Initial Patent Examination Division (703) 308-1202
PART 1 - ATTORNEY/APPLICANT COPY

Application No. (if known): 10/801,926 Attorney Docket No.: 03282/100L581-US2

Certificate of Express Mailing Under 37 CFR 1.10

I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail, Airbill No. in an envelope addressed to:

EL 996121767 -US

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

on August 3, 2004
Date

D Davis
Signature

D DAVIS
Typed or printed name of person signing Certificate

Note: Each paper must have its own certificate of mailing, or this certificate must identify each submitted paper.

Petition For The Granting Of A Filing Date For A Non-Provisional Application Under 37 C.F.R. §1.182 (2 pages); and
Exhibits A-D.

Check No. 5689 for $130.00.

PTO/SB/05 (08-03)
Approved for use through 07/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	03282/100L581-US2
First Inventor	Hans-Joerg Voegel
Title	METHOD AND SYSTEM FOR DELIVERING CONTENT OVER A NETWORK
Express Mail Label No.	EL 983946111US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: MS Patent Application
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

1. [ ] Fee Transmittal Form (e.g., PTO/SB/17) *(Submit an original, and a duplicate for fee processing)*
2. [X] Applicant claims small entity status. See 37 CFR 1.27.
3. [X] Specification [*Total Pages* 24]
   (preferred arrangement set forth below)
   - Descriptive title of the invention
   - Cross Reference to Related Applications
   - Statement Regarding Fed sponsored R & D
   - Reference to sequence listing, a table, or a computer program listing appendix
   - Background of the Invention
   - Brief Summary of the Invention
   - Brief Description of the Drawings *(if filed)*
   - Detailed Description
   - Claim(s)
   - Abstract of the Disclosure
4. [X] Drawing(s) *(35 U.S.C. 113)* [*Total Sheets* 13]
5. Oath or Declaration [*Total Sheets*]
   a. [ ] Newly executed (original or copy)
   b. [ ] Copy from a prior application (37 CFR 1.63(d)) *(for continuation/divisional with Box 18 completed)*
      i. [ ] DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. [X] Application Data Sheet. See 37 CFR 1.76
7. [ ] CD-ROM or CD-R in duplicate, large table or Computer Program *(Appendix)*
8. Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all necessary)*
   a. [ ] Computer Readable Form (CRF)
   b. Specification Sequence Listing on:
      i. [ ] CD-ROM or CD-R (2 copies); or ii. [ ] Paper
   c. [ ] Statements verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

9. [ ] Assignment Papers (cover sheet & document(s))
10. [ ] 37 CFR 3.73(b) Statement *(when there is an assignee)* [ ] Power of Attorney
11. [ ] English Translation Document *(if applicable)*
12. [ ] Information Disclosure Statement (IDS)/PTO-1449 [ ] Copies of IDS Citations
13. [ ] Preliminary Amendment
14. [X] Return Receipt Postcard (MPEP 503) *(Should be specifically itemized)*
15. [ ] Certified Copy of Priority Document(s) *(if foreign priority is claimed)*
16. [ ] Nonpublication Request under 35 U.S.C. 122 (b)(2)(B)(i). Applicant must attach form PTO/SB/35 or its equivalent.
17. [ ] Other:

18. If a CONTINUING APPLICATION, *check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:*

[X] Continuation [ ] Divisional [ ] Continuation-in-part (CIP) of prior application No.: 10/464,804

Prior application information: Examiner Not Yet Assigned *Art Unit:* 2316

For CONTINUATION OR DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

19. CORRESPONDENCE ADDRESS

[X] Customer Number: 07278 *OR* [ ] Correspondence address below

Name	DARBY & DARBY P.C. David Leason				
Address	P.O. Box 5257				
City	New York	*State*	NY	*Zip Code*	10150-5257
Country	US	*Telephone*	(212) 527-7700	*Fax*	(212) 753-6237

Name (Print/Type)	David Leason	*Registration No. (Attorney/Agent)*	36,195
Signature		*Date*	March 15, 2004

Express Mail Label No.	EL 983946111US
Dated:	3/15/04

Application No. (if known): Attorney Docket No.: 03282/100L581-US2

Certificate of Express Mailing Under 37 CFR 1.10

I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail, Airbill No. EL983946111US in an envelope addressed to:

MS Patent Application
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

on March 15, 2004
Date

Signature

Pat Campbell
Typed or printed name of person signing Certificate

Note: Each paper must have its own certificate of mailing, or this certificate must identify each submitted paper.

Specification (24 pages);

Drawings (Figures 1-8, 9A, 9B, 10-12; 13 pages);

Application Data Sheet (2 pages);

Utility Patent Application Transmittal (1 page);

Postcard

EL 983946111 US

EXPRESS MAIL
UNITED STATES POSTAL SERVICE®

Customer Copy
Label 11-F June 2002

Post Office To Addressee

ORIGIN (POSTAL USE ONLY)

PO ZIP Code: 100-22	Day of Delivery: ☐ Next ☑ Second	Flat Rate Envelope: ☐
Date In: Mo. 3 Day 15 Year 04	☐ 12 Noon ☐ 3 PM	Postage: $ 17.65
Time In: ☑ AM ☐ PM 0900	Military: ☐ 2nd Day ☐ 3rd Day	Return Receipt Fee:
Weight: lbs. oz.	Int'l Alpha Country Code:	COD Fee: / Insurance Fee:
No Delivery: ☐ Weekend ☐ Holiday	Acceptance Clerk Initials:	Total Postage & Fees: $ 17.65

DELIVERY (POSTAL USE ONLY)

Delivery Attempt: Mo. Day	Time: ☐ AM ☐ PM	Employee Signature
Delivery Attempt: Mo. Day	Time: ☐ AM ☐ PM	Employee Signature
Delivery Date: Mo. Day	Time: ☐ AM ☐ PM	Employee Signature

☐ WAIVER OF SIGNATURE (Domestic Only) Additional merchandise insurance is void if waiver of signature is requested. I/we authorize delivery to be made without obtaining signature of addressee or addressee's agent (if delivery employee judges that article can be left in secure location) and I/we authorize that delivery employee's signature constitutes valid proof of delivery.

NO DELIVERY: ☐ Weekend ☐ Holiday

Customer Signature

CUSTOMER USE ONLY

METHOD OF PAYMENT:
Express Mail Corporate Acct. No.:
Federal Agency Acct. No. or Postal Service Acct. No.:

FROM: (PLEASE PRINT) PHONE 212 527 7774

DARBY & DARBY PC
805 3RD AVE FL 27
NEW YORK NY 10022-7513

03282/100L581-US2 DL

TO: (PLEASE PRINT) PHONE ( )

MAIL STOP PATENT APPLICATION
COMMISSIONER FOR PATENTS
PO BOX 1450
ALEXANDRIA VA 22313-1450

PRESS HARD.
You are making 3 copies.

FOR PICKUP OR TRACKING CALL 1-800-222-1811 www.usps.com

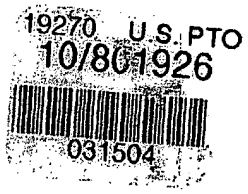
EMS

Atty Docket No.: 03282/100L581-US2

Inventor: Hans-Joerg Voegel

Appln: Not Yet Known **Filed:** Herewith

Title: A METHOD AND SYSTEM FOR DELIVERING CONTENT OVER A NETWORK



Documents:

Specification (24 pages);
Drawings (Figures 1-5, 7, 8, 10-12; 13 sheets);
Application Data Sheet (2 pages);
Utility Patent Application Transmittal (1 page); and
Certificate of Mailing

EL983946111US

Via: Express Mail: Airbill No.

Sender Initials: DL/bms **Date:** March 15, 2004

METHOD AND SYSTEM FOR DELIVERING CONTENT OVER A NETWORK

This application claims the benefit of priority under 35 U.S.C. § 119(e) from U.S. Provisional Application Serial No. 60/390,029, filed June 17, 2002, entitled "Method and System for Delivering Content of Learning Sessions Over the Internet," the disclosure of which is hereby incorporated by reference as if set forth in its entirety herein.

Background of the Invention

1. Field of the Invention

The present invention relates to providing streaming media data over coupled and heavily trafficked public/private computer networks. More particularly, the present invention relates to architectures for server deployment that reduce problems associated with the public network usage that otherwise impede efficient data subscription services to users.

2. Description of Related Art

The number of computers connected to the Internet has grown tremendously in recent years. A client/server description of the interactions between computers is well-known. A "client"

computer connected to the Internet can download digital information from "server" computers. Client application software typically accepts commands from a user and obtains data and services by sending requests to server applications running on the server computers. A number of protocols may be used to exchange commands and data between computers connected to the Internet. For instance, protocols including the File Transfer Protocol (FTP), the Hyper Text Transfer Protocol (HTTP), the Simple Mail Transfer Protocol (SMTP), and the Gopher document protocol are commonly used.

Typically, the HTTP protocol is used to access data on the World Wide Web (the Web). The Web is an information service on the Internet providing documents and information, as well as links between documents and information. It is made up of numerous Web sites located around the world that maintain and distribute electronic documents. A Web site may use one or more Web server computers that store and distribute documents in a number of formats, including the Hyper Text Markup Language (HTML). An HTML document contains text and metadata (commands providing formatting information), as well as embedded links that reference other data or documents.

The referenced documents may represent text, graphics, video, streaming-media or any combination thereof.

A Web browser is a client application or, preferably, an integrated operating system utility that communicates with server computers via FTP, HTTP and Gopher protocols. Web browsers retrieve electronic documents from the network and present them to a user. Web browsers receive content from a server sent over the Internet that is typically encoded in Hyper Text Markup Language (HTML) and executed by the browser on a client computer. To remove

limitations imposed by using only HTML scripts, browsers typically support the usage of additional components such as Java Applets, ActiveX Controls, and Plug-Ins that provide extra functionality. These additional components, commonly referred to as "client bits," are typically stored as executables in the memory of the client computer, and can be installed onto the client computer directly from a storage medium or downloaded from a server over the Internet. The functional components such as Java Applets, ActiveX Controls, and Plug-Ins are mapped into the script so that actions, methods, or properties of an object can be called therefrom. (ActiveX Controls are reusable software components that incorporate ActiveX technology, which enables software applications to interact with one another in a networked environment regardless of the language in which the components were created. ActiveX Controls can be embedded in Web pages to produce animation and other multimedia effects, interactive objects and sophisticated applications. ActiveX Controls can be written in a variety of programming languages, including C, C++, Visual Basic, and Java. A Plug-In, on the other hand, is a software component designed to plug into the Netscape Navigator browser, and to permit the browser to access and execute files embedded in HTML documents that are in formats the browser normally would not normally recognize.)

Web browsers typically contain an associated scripting space, which is memory space allocated for a browser instance, for the reception of electronic data called a script. Web browsers receive scripts from the network into the scripting space and execute instructions contained in the script. One such instruction contained in a script might be presenting data to a user, usually by way of an output device such as a computer monitor. In addition to data for presentation to a user, the script may also contain mappings to objects and services stored in the memory of a client computer and instructions for interaction with or communication to and from those objects and

services. A script might also contain additional instructions as well. An exchange between script instructions in a scripting space and a service or an object can be facilitated by additional objects, such as a Plug-In or ActiveX control. In these cases, a mapping to the Plug-In or ActiveX control is contained in the script, and the Plug-In or ActiveX control performs some operation towards carrying out the script instruction.

Through such technology, the Web or Internet has become a major communication medium wherein large volumes of streaming media, such as video presentation, are provided to users on a daily basis. Streaming media is a rich and powerful means of information delivery, which has clear advantages in the business environment. The power of video, combined with the ubiquity of the Internet, offers businesses a robust new platform for communication and collaboration. In today's global economy, streaming enables businesses to gain competitive advantage.

To date, however, the transmission of video over the Internet has been plagued by the "watch and wait" phenomenon. Previous IP video technology required that viewers first download a segment in its entirety before playback could begin. As a result, currently available streaming media applications generally suffer from degradation in the quality of service (QoS) as applied to networked environments (e.g., Internet). The degradation in quality of service (QoS) is generally attributable to network congestion and data capacity limitations in communication links and conduits (e. g., connectivity), as well as other factors that generally affect quality of service (QoS). As a result, in current streaming media applications as applied to networked environments, the end user or client typically will experience degradation in the quality of the particular media application. Typical problems associated with such degraded media applications are a loss in sound quality, picture quality, or actual operation of the media

application at the end user's interface that is attributable to transmission congestion. Therefore, as streaming media becomes a more widely employed and accepted communication medium, quality of service (QoS) considerations are becoming an increasingly important factor in providing streaming media applications. See PCT publication W001/41399 for a methodology that addresses streamed media in the context of a conventional networked environment.

With the growth of rich content, enterprises find themselves with a problem: the every-day use of rich content applications develop an enormous demand for bandwidth, often saturating corporate backbone networks and adversely impacting mission-critical applications. Thus, there remains a need for methods to address quality of service (QoS) concerns of streaming media applications within private corporate network environments, especially to enterprise content delivery networks (eCDN) and multi-tiered eCDNs.

SUMMARY OF THE INVENTION

This invention provides methods for delivering streaming data to subscribing clients with high quality of service. The methodologies reduce problems associated with network usage that otherwise impede efficient data subscription services through the use of metadata for content replication and intelligent, automated distribution.

In accordance with one aspect of the invention, content stored in association with metadata is automatically redirected over coupled computer networks. A portal is configured to deliver the stored content to a plurality of distributed client machines via one or more designated network edge servers. The portal receives one or more requests for one or more content portions from a

particular client machine and utilizes the metadata to provide such content portions to a first network edge server for delivery to the particular client machine. The method selectively provides either the same portions of the content that have been delivered to the first network edge server or further portions of the content to a second network edge server while automatically redirecting the particular client machine to the second network edge server in real-time.

Redirection can be performed in accordance with predetermined criteria which is preferably related to the performance of the network branch that includes the first network edge server.

These and other features, aspects and advantages of the invention will be apparent from a review of the accompanying drawing figures and detailed description of several embodiments.

BRIEF DESCRIPTION OF THE FIGURES

Figure 1 illustrates a general overview of a computing environment.

Figure 2 illustrates an exemplary embodiment of a conventional network environment in which the invention can be deployed.

Figure 3 illustrates problems associated with related art methodologies.

Figure 4 illustrates an embodiment serving via the open Internet from the service provider's Network Operations Center (NOC).

Figure 5 illustrates an embodiment serving via media servers in the client's NOC.

Figure 6 illustrates an embodiment serving via local sub-net media servers.

Figure 7 illustrates an embodiment serving via media servers in the client's NOC and channel partners.

Figure 8 illustrates an embodiment serving via local sub-net media servers and channel partners.

Figures 9A and 9B illustrates flow charts for the scenarios of Figures 4 through 8.

Figure 10 is a schematic diagram of a learning management system in accordance with a preferred embodiment of invention.

Figure 11 is a schematic diagram of an integrated digital media asset management system (DMAM) with an enterprise content delivery network (eCDN) in a multi-tiered application of the preferred embodiment of Figure 10.

DETAILED DESCRIPTION

Figure 1 and the following description are intended to provide a general description of a suitable computing environment in which the invention may be implemented. Although not necessarily required, the invention will be described in the general context of computer-executable instructions, such as program modules, being executed by a computer, such as a client workstation or a server.

Generally, program modules include routines, programs, objects, components, data structures and the like that perform particular tasks or implement particular abstract data types. Moreover, those skilled in the art will appreciate that the invention may be practiced with other computer

system configurations, including hand-held devices, multi-processor systems, microprocessor-based or programmable consumer electronics including cellular telephones, network PCs, minicomputers, mainframe computers and the like. The invention may also be practiced in distributed computing environments where tasks are performed by remote processing devices that are linked through a communications network. In a distributed computing environment, program modules may be located in both local and remote memory storage devices.

As shown in Figure 1, an exemplary general purpose computing system may include a conventional personal computer 20 or the like, including a processing unit 21, a system memory 22, and a system bus 23 that couples various system components including the system memory 22 to the processing unit 21. The system bus 23 may be any of several types of bus structures including a memory bus or memory controller, a peripheral bus, and a local bus using any of a variety of bus architectures. The system memory 22 may include read-only memory (ROM) 24 and random access memory (RAM) 25. A basic input/output system 26 (BIOS), containing the basic routines that help to transfer information between elements within the personal computer 20, such as during start-up, may be stored in ROM 24. The personal computer 20 may further include a hard disk drive 27 for reading from and writing to a hard disk (not shown), a magnetic disk drive 28 for reading from or writing to a removable magnetic disk 29, and an optical disk drive 30 for reading from or writing to a removable optical disk 31 such as a CD-ROM or other optical media. The hard disk drive 27, magnetic disk drive 28, and optical disk drive 30 may be connected to the system bus 23 by a hard disk drive interface 32, a magnetic disk drive interface 33, and an optical drive interface 34, respectively.

The drives and their associated computer-readable media provide non-volatile storage of computer readable instructions, data structures, program modules and other data for the personal computer 20. Although the exemplary embodiment described herein may employ a hard disk, a removable magnetic disk 29, and a removable optical disk 31, or combination therefor, it should be appreciated by those skilled in the art that other types of computer readable media which can store data that is accessible by a computer, such as magnetic cassettes, flash memory cards, digital video disks, Bernoulli cartridges, random access memories (RAMs), read-only memories (ROMS) and the like may also be used in the exemplary operating environment.

A number of program modules may be stored on the hard disk, magnetic disk 29, optical disk 31, ROM 24 or RAM 25, including an operating system 35, one or more application programs 36, other program modules 37 and program data 38. A user may enter commands and information into the personal computer 20 through input devices such as a keyboard 40 and pointing device 42. Other input devices (not shown) may include a microphone, joystick, game pad, satellite disk, scanner, or the like. These and other input devices are often connected to the processing unit 21 through a serial port interface 46 that is coupled to the system bus 23, but may be connected by other interfaces, such as a parallel port, game port, or universal serial bus (USB). A monitor 47 or other type of display device may also be connected to the system bus 23 via an interface, such as a video adapter 48. In addition to the monitor 47, personal computers may typically include other peripheral output devices (not shown), such as speakers and printers.

The personal computer 20 may operate in a networked environment using logical connections to one or more remote computers, such as a remote computer 49. The remote computer 49 may be another personal computer, a server, a router, a network PC, a peer device or other common

network node, and typically includes many or all of the elements described above relative to the personal computer 20, although only a memory storage device 50 has been illustrated in Figure 1. The logical connections depicted in Figure 1 include a local area network (LAN) 51 and a wide area network (WAN) 52. Such networking environments are commonplace in offices, enterprise-wide computer networks, intranets, and the Internet.

When used in a LAN networking environment, the personal computer 20 is connected to the LAN 51 through a network interface or adapter 53. When used in a WAN networking environment, the personal computer 20 typically includes a modem 54 or other means for establishing communications over the wide area network 52, such as the Internet. The modem 54, which may be internal or external, is connected to the system bus 23 via the serial port interface 46. In a networked environment, program modules depicted relative to the personal computer 20, or portions thereof, may be stored in the remote memory storage device. It will be appreciated that the network connections shown are exemplary and other means of establishing a communications link between the computers may be used such as T-1, T-3, digital subscriber line (DSL), cable modem and other conventionally available hardware links.

As noted, the computer described above can be deployed as part of a computer network. In general, the above description applies to both server computers and client computers deployed in a network environment. Figure 2 illustrates one such exemplary network environment in which the present invention may be employed. As shown in Figure 2, a number of servers 10a, 10b, etc., are interconnected via a communications network 160 (which may be a LAN, WAN, intranet or the Internet) with a number of client computers 20a, 20b, 20c, etc.. In a network environment in which the communications network 160 is, e. g., the Internet, the servers 10 can be Web servers

with which the clients 20 communicate via any of a number of known protocols such as, for instance, hypertext transfer protocol (HTTP). Each client computer 20 can be equipped with a browser 180 to gain access to the servers 10, and client application software 185. As shown in the embodiment of Figure 2, server 10a includes or is coupled to a dynamic database 12.

As shown, the database 12 may include database fields 12a, which contain information about items stored in the database 12. For instance, the database fields 12a can be structured in the database in a variety of ways. The fields 12a could be structured using linked lists, multi-dimensional data arrays, hash tables, or the like. This is generally a design choice based on ease of implementation, amount of free memory, the characteristics of the data to be stored, whether the database is likely to be written to frequently or instead is likely to be mostly read from, and the like. A generic field 12a is depicted on the left side. As shown, a field generally has sub-fields that contain various types of information associated with the field, such as an ID or header sub-field, type of item sub-field, sub-fields containing characteristics, and so on. These database fields 12a are shown for illustrative purposes only, and as mentioned, the particular implementation of data storage in a database can vary widely according to preference.

Thus, the present invention can be utilized in a computer network environment having client computers for accessing and interacting with the network and a server computer for interacting with client computers and communicating with a database with stored inventory fields. Likewise, the streaming media process of the present invention can be implemented with a variety of network-based architectures, and thus should not be limited to the examples shown.

Figure 3 illustrates some typical problems of the prior art, including bandwidth and connectivity problems. As mentioned above, previous IP video technology required that viewers first

download a segment in its entirety before playback could begin. The present invention provides a solution to such problems for data streaming and is described below with reference to several preferred embodiments, and, as described in connection with Figures 10-12 below, can extract metadata from a digital media asset management (DMAM) sub-system to drive content delivery.

Figure 10 illustrates schematically an arrangement in which learning lessons of a subject of any type are available and managed at a Learning Management System (LMS) 10 location that has a portal 11 for upload and download via internet connection 12. As illustrated in Fig. 10, the LMS can be used for corporate training such as sales techniques, competitive awareness, policy dissemination and other functions.

The LMS 10 has provision for session scheduling 14, curriculum management 16, progress tracking for the individual student 18, and exams and scoring 20 for the student. The curriculum management section 16 of the LMS is supplied content directly or over the Internet from a content manager 30 that contains the necessary lesson data. The portal 11 of the LMS can be managed by an applicable program 34 such as the IBM Websphere Suite, which also has connection to the Internet 12.

Program distribution to the individual student clients is managed on an overall basis by the module 40 (such as the Corecast™ module made available by the Fantastic Corporation, headquartered in Zug, Switzerland) having a section 42 that communicates with the LMS session scheduling section 14. The data from the content manager 30 can be passed to the module 40.

The module 40 also includes a master control server (MCS) which provides at the NOC a server architecture that performs redirection, content distribution and edge server monitoring.

Redirection is preferably performed in accordance with predetermined criteria that is programmed into the MCS. The predetermined criteria can include the presently available bandwidth, the hop count, latency, and router queue depth that are applicable through a given path to the client machine. The redirection is automatically performed to better ensure optimal content transmission to distributed client machines, but is selectively performed, for example, when threshold levels for the predetermined criteria are not satisfied. These criteria are gauged through conventional network performance monitoring software. The MCS can be associated with either the eCDN module 40 or the edge content server 48. As well, the module 40 includes an edge content server (ECS) that runs caching and streaming operations, and which also can perform network analysis via the NDC application.

With further reference to Figure 10, client computers 20 with a browser application 180 executing thereupon interact with the portal 11 and content access software 34 to access a library of digital media. The content manager 30 interacts with the module 40 to enable the delivery of rich media to geographically diverse clients 20 by linking applications with a distributed network of intelligent servers at the edge of the network. When a user at a client 20 requests content, it is served from the closest edge server, rather than a centralized server that may be in a distant place on the network.

Delivery of the content (e.g., lessen data) is managed by the delivery section 46, which has two way communication with the Internet so that a user (student) can respond. The delivery section 46 includes an edge content server 48, which is shown in greater detail in Fig. 11. This acts to

deliver content to individual users (students) on a personalized basis with facility for authentication of each individual user's identity. As described next, the module 40 combines network analysis with caching, streaming, load balancing, and redirection technology to make intelligent decisions for bandwidth management and content routing over enterprise WANs and LANs.

Referring now to Figure 11, the edge content server 48 comprises a back-end application that manages all device, applications, and services on the overlay network on which the module 40 operates. The edge content server replaces conventional flat-file media objects storage with a digital media asset management (DMAM) system. The DMAM serves objects as does a conventional file storage system but also utilizes metadata to permit intelligent content management and distribution. The metadata permits coordination of content distribution and scheduling. See, e.g., U.S. Patent No. 6,477,707, assigned to the present assignee, for more information on the use of such metadata.

Metadata from the DMAM is extracted in an enterprise content delivery network (eCDN) for distribution to a network edge. The metadata is replicated and utilized to drive automated content distribution. Referential integrity is maintained through continued communications between an enterprise portal, the DMAM and the eCDN, as illustrated by bi-directional arrows denoted "3" in Figure 11. Workflow integration with the DMAM client provides for ease of distribution fulfillment and metadata-driven automation. The enterprise portal includes authentication authorization which integrates with the network edge for controlled distribution of content.

Figure 12 illustrates a variety of media objects 200 which are provided to a master control server 210 which can be located, for example, at a corporate headquarters or other source location. The media objects are scheduled and distributed across a wide area network or virtual private network, for example, to intelligent edge content servers at various and potentially dispersed client locations 20a, 20b.

In one embodiment, a segment does not need to be downloaded in its entirety before playback can begin due to compression of the data for streaming delivery over varied bandwidth connections (e. g., low-bandwidth connections). Commercially available software such as Real Network Real Video, or Microsoft Windows Media or Apple Quicktime/Sorenson or MPEG codecs may be used for the compression. When compressed, up-to-the-minute information can be deployed to globally dispersed online audiences with quality and performance. End-users can immediately view and interact with streaming video using a computer equipped with minimum capabilities.

Using well-known commercial client/server streaming applications (such as, for example, Real Networks Real Server or Microsoft Windows Media Server or Apple Darwin Quicktime Streaming Server), the method and system described herein can provide quality Internet video broadcasts. In one embodiment, live or pre-recorded analog video feed is captured, edited, and encoded at which point it is uploaded on streaming-enabled servers (NOC). Depending on the scenario, the content is either made available "live" or archived for on-demand viewing.

End users simply access a user interface and log onto the streaming media system with a password and the video is available for interaction. In one embodiment, the video or streaming media, which is embedded in a customized GUI and augmented with other forms of media, is

streamed as a continuous file and can be delivered over low bandwidths (28.8K and 56K dial-up modems).

No content need be downloaded to the end user's hard drive. Instead, content resides on distribution servers that are available on the network and is decoded as it is received at the client PC, using a small one-time downloadable or provided plug-in (e. g. Windows Media Player, RealPlayer). Streaming involves no special network requirements and minimum end-user system requirements. Because it is highly scalable, it is greatly enhanced by the multimedia capabilities of more powerful machines operating at higher bandwidths (ISDN, T-1, T-3, ADSL, cable).

Figure 4 illustrates a first scenario for use of the invention involving serving client media via the open, public Internet 410 from servers located in a service provider's private Network Network Operations Center (NOC) 420. Inside the service provider's Network Control Center (NCC) 430, personnel create and publish media files on a staging server, which resides in the service provider's NCC. After the files are created and placed on the staging server, personnel then use a content distribution tool (such as, for example, Interwoven OpenDeploy or Vignette Syndication Server) to categorize the files according to client, and client subgroups (for example, departments, buildings, etc). After categorization is complete, the service provider personnel use the content distribution tool to schedule publishing of the files, be it either immediate or at some future time.

The files are then published (copied) to media servers 425 in the service provider's Operations Center and are then available for viewing at client locations 450-480 via the open, public Internet. Inside the NOC 420, the media servers may be monitored for system health, file system integrity and security from monitoring machines in the service provider's NCC.

Figure 5 illustrate a second scenario for use of the invention involving serving client media from service provider's servers 510 located in the client's Network Operations Center (NOC) 480 to overcome latency and packet-loss problems present when trying to view media files over the open Internet 410.

The media servers 480 are here shown installed in the client's NOC 480 in accordance with the client's security requirements. After installation, the flow of information is fairly similar to the first scenario, above. Inside the service provider's Network Control Center (NCC) 430, service provider personnel create and publish media files on a staging server, which resides in the service provider's NCC. After the files are created and placed on the staging server, personnel then use a standard content distribution tool to categorize the files according to client, and client subgroups (for example, departments, buildings, etc). After categorization is complete, the service provider personnel use the content distribution tool to schedule publishing of the files, be it either immediate or at some future time. The files are then published (copied) to media servers 425 in the service provider's Network Operations Center for any client employees who still need to view the files via the open Internet. In one embodiment, the files are also published to the service provider's servers 510 located in the client NOC 480 and are then available for client viewing directly from the servers in the client's NOC. Inside the client and service provider's respective NOCs, the service provider's servers may be monitored for system health, file system integrity and security from monitoring machines in the service provider's NCC in accordance with the client's established security policy.

Figure 6 illustrates a third scenario for use of the invention involving serving client media from service provider's servers located in the client's local area networks (LAN) on sub-networks.

Under this scenario, the content delivery overcomes latency and packet-loss problems present when trying to view media files over the open, public Internet 410 as well as congested network links inside the client's private network. The servers are installed on the client's LAN in accordance with the client's security requirements. After installation, the flow of information is similar to the second scenario, above, except that in this case the local media servers 610 are placed in the buildings and local sub-nets where end-users are located. Inside the service provider's Network Control Center (NCC), personnel create and publish media files on a staging server residing in the service provider's NCC. After the files are created and placed on the staging server, personnel then use a standard content distribution tool (as exemplified above) to categorize the files according to client, and client subgroups (for example, departments, buildings, etc). After categorization is complete, personnel use the content distribution tool to schedule publishing of the files be it either immediate or at some future time.

The files are then published (copied) to media servers in the service provider's Network Operations Center for any client employees who still need to view the files via the open Internet. The files are also published to the service provider's servers located in the client's NOC, and media servers located on the client's local subnets where the target audience resides. The content is then available for client viewing directly from the servers located closest to the client (be it the servers on their sub-net or the servers in the client's NOC). Inside the client and service provider's NOC and client sub-nets, servers are monitored for system health, file system integrity and security from monitoring machines in the service provider's NCC in accordance with the client's established security policy.

Figure 7 illustrates a fourth scenario for use of the invention involving serving client media created by channel partners from service provider's servers located in the client's Network Operations Center 480. This overcomes latency and packet-loss problems present when trying to view media files over the open Internet. The servers are installed in the client's NOC in accordance with the client's security requirements. After installation, the flow of information is similar to the second scenario, above, except that in this case the media isn't coming from the service provider or client, but rather from Channel Partners who wish to get their media into the client's networks with good quality of service. Inside the Channel Partner's Network Control Center (NCC) 710, personnel create and publish media files on a staging server, which resides in the Channel Partner's NOC. After the files are created and placed on the staging server 720, personnel then use a standard content distribution tool to categorize the files according to client, and client subgroups (for example, departments, buildings, etc). After categorization is complete, Channel Partner personnel use the content distribution tool to schedule publishing of the files be it either immediate or at some future time. The files are then published (copied) to media servers 425 in the service provider's Network Operations Center 420 for any client employees who still need to view the files via the open Internet. The files are also published to the service provider's servers 510 located in the client NOC 480. The content is then available for client viewing directly from the servers located in the client NOC. Inside the client's and service provider's respective NOCs, the servers may be monitored for system health, file system integrity and security from monitoring machines in the service provider's NCC in accordance with the client's established security policy.

Figure 8 illustrates a fifth scenario for use of the invention involving serving client media created by channel partners from service provider's servers located in the client's local area networks

(LAN) on sub-nets. In this scenario, the content is to be delivered to overcome latency and packet loss problems that are present when trying to view media files over the open, public Internet as well as congested network links inside the client's private network. The servers are installed on the client's LAN in accordance with the client's security requirements. After installation, the flow of information is similar to the third scenario, above, except that in this case the media isn't coming from the service provider or client, but rather from Channel Partners who wish to get their media into the client's networks with good quality of service. Inside the Channel Partner Network Control Center (NCC), media files are created and published on a staging server, which resides in the Channel Partner's NOC. After the files are created and placed on the staging server, Channel Partner personnel then use a standard content distribution tool (as exemplified above) to categorize the files according to client, and client subgroups (for example, departments, buildings, etc). After categorization is complete, Channel Partner personnel uses the content distribution tool to schedule publishing of the files be it either immediate or at some future time. The files are then published (copied) to media servers in the service provider's Network Operations Center for any client employees who still need to view the files via the open Internet. The files are also published to the service provider's servers located in the client's NOC, and media servers located on the client's local sub-nets where the target audience of end-users resides. The content is then available for client viewing directly from the servers located closest to the client (be it the servers on their sub-net or the servers in the client NOC) Inside the client and service provider's respective NOCs and client sub-nets, servers are monitored for system health, file system integrity and security from monitoring machines in the service provider's NCC in accordance with the client's established security policy.

Figures 9A and 9B show flow charts 400 through 800 which correspond to the five illustrative embodiments described above in reference to Figures 4-8.

The following currently pending applications relate to the present application and are hereby fully incorporated by reference in their entirety: Serial No. 09/046,901, filed March 24, 1998 entitled "Method and System for Broadcast Transmission of Media Objects," now U.S. Patent No.6,477,707; Serial No. 09/364,761, filed July 30, 1999 entitled "Data Transmission;" Serial No. 09/385,746, filed August 30, 1999 entitled "System and Method for Automatically Rescheduling A Data Transmission To Members Of A Group;" Serial No. 60/345,501, filed October 24, 2001 entitled "One Touch Platform;" and Serial No. 10/062,830 filed January 31, 2002, entitled "Data Packet Timing For Controlled Bandwidth."

The foregoing description of preferred embodiments of the invention has been presented for the purposes of illustration and description. It is not meant to be exhaustive or to limit the invention to the precise forms disclosed since many modifications and variations will be apparent to those skilled in this art. Rather, it is intended that the following claims and their equivalents define the scope of the invention.

I claim:

1. A method for automatically redirecting content over coupled computer networks, comprising:

storing content for delivery across the coupled networks, the content being stored in association with metadata;

providing a portal to an enterprise computer network, the enterprise computer network being configured to deliver the stored content to a plurality of distributed client machines via one or more designated network edge servers;

receiving at the portal a content request from a particular client machine;

utilizing the metadata to provide at least a first portion of the content to a first network edge server associated with the coupled computer networks for delivery to the particular client machine; and

selectively providing one of the first portion and a further portion of the content to a second network edge server while automatically redirecting the particular client machine to the second network edge server in real-time in accordance with predetermined criteria,

whereby more optimal content transmission is maintained to the particular client machine.

2. The method of claim 1, wherein the first network edge server is disposed proximate to the particular client machine and the second network edge server is less proximate to the particular client machine.

3. The method of claim 2, wherein the first network edge server is geographically proximate to the particular client machine.

4. The method of claim 2, wherein the first network edge server is temporally proximate to the particular client machine.

5. The method of claim 1, wherein the predetermined criteria is one of available bandwidth, hop count, latency, and router queue depth.

ABSTRACT

Content stored in association with metadata is automatically redirected over coupled computer networks. A portal is configured to deliver the stored content to a plurality of distributed client machines via one or more designated network edge servers. The portal receives content requests from a particular client machine and utilizes the metadata to provide content portions to a first network edge server for delivery to the particular client machine. Modules such as software modules selectively provide either the first portion of the content or a further portion of the content to a second network edge server while automatically redirecting the particular client machine to the second network edge server in real-time. Redirection is performed in accordance with predetermined criteria which is preferably related to the performance of the network branch that includes the first network edge server.

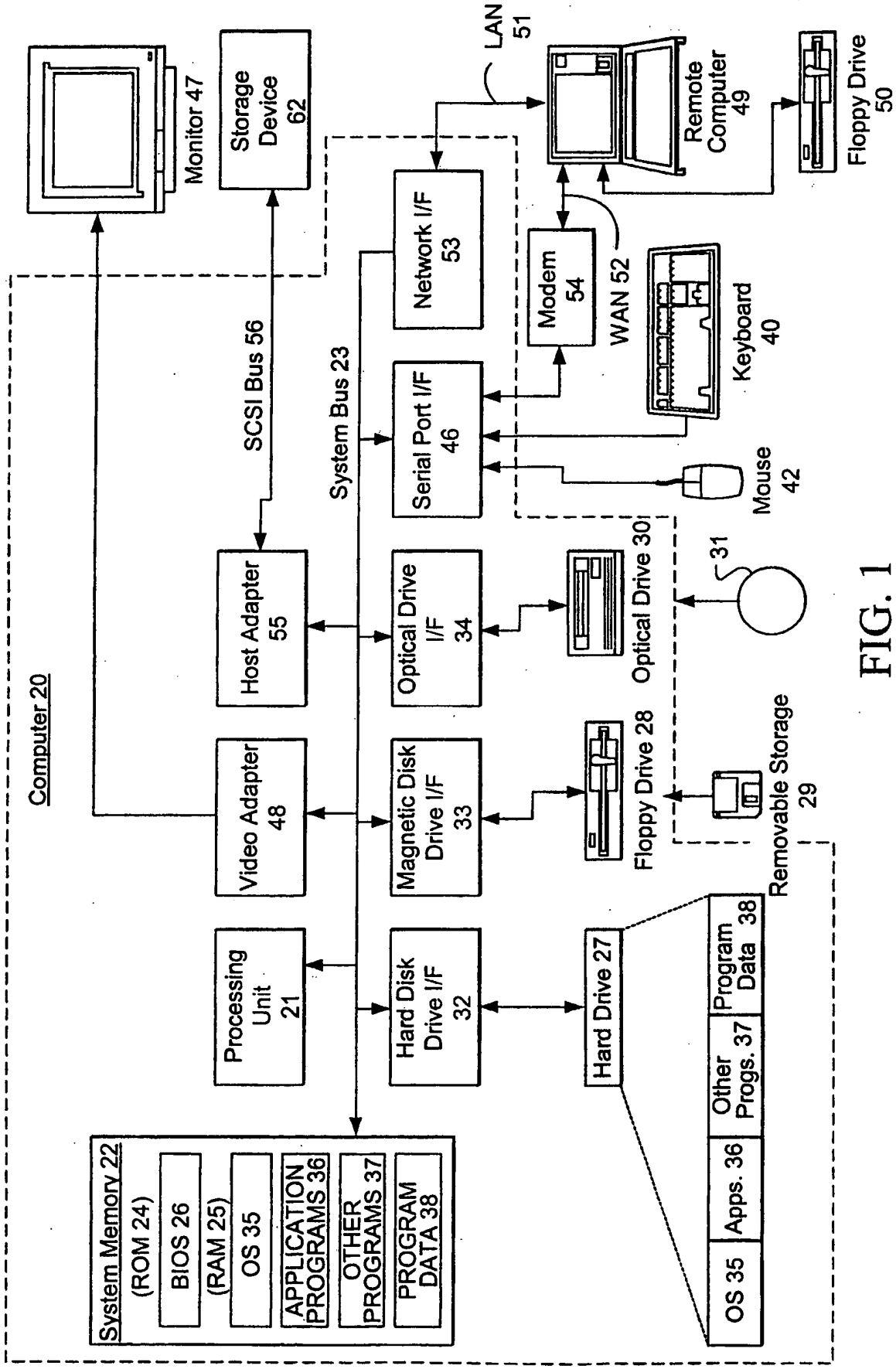

Computer 20
Monitor 47
Storage Device 62
LAN 51
Remote Computer 49
Floppy Drive 50
Network I/F 53
Modem 54
WAN 52
Keyboard 40
SCSI Bus 56
System Bus 23
Serial Port I/F 46
Mouse 42
Host Adapter 55
Optical Drive I/F 34
Optical Drive 30
31
Video Adapter 48
Magnetic Disk Drive I/F 33
Floppy Drive 28
Removable Storage 29
Processing Unit 21
Hard Disk Drive I/F 32
Hard Drive 27
Program Data 38
Other Progs. 37
Apps. 36
OS 35
System Memory 22
(ROM 24)
BIOS 26
(RAM 25)
OS 35
APPLICATION PROGRAMS 36
OTHER PROGRAMS 37
PROGRAM DATA 38

FIG. 1

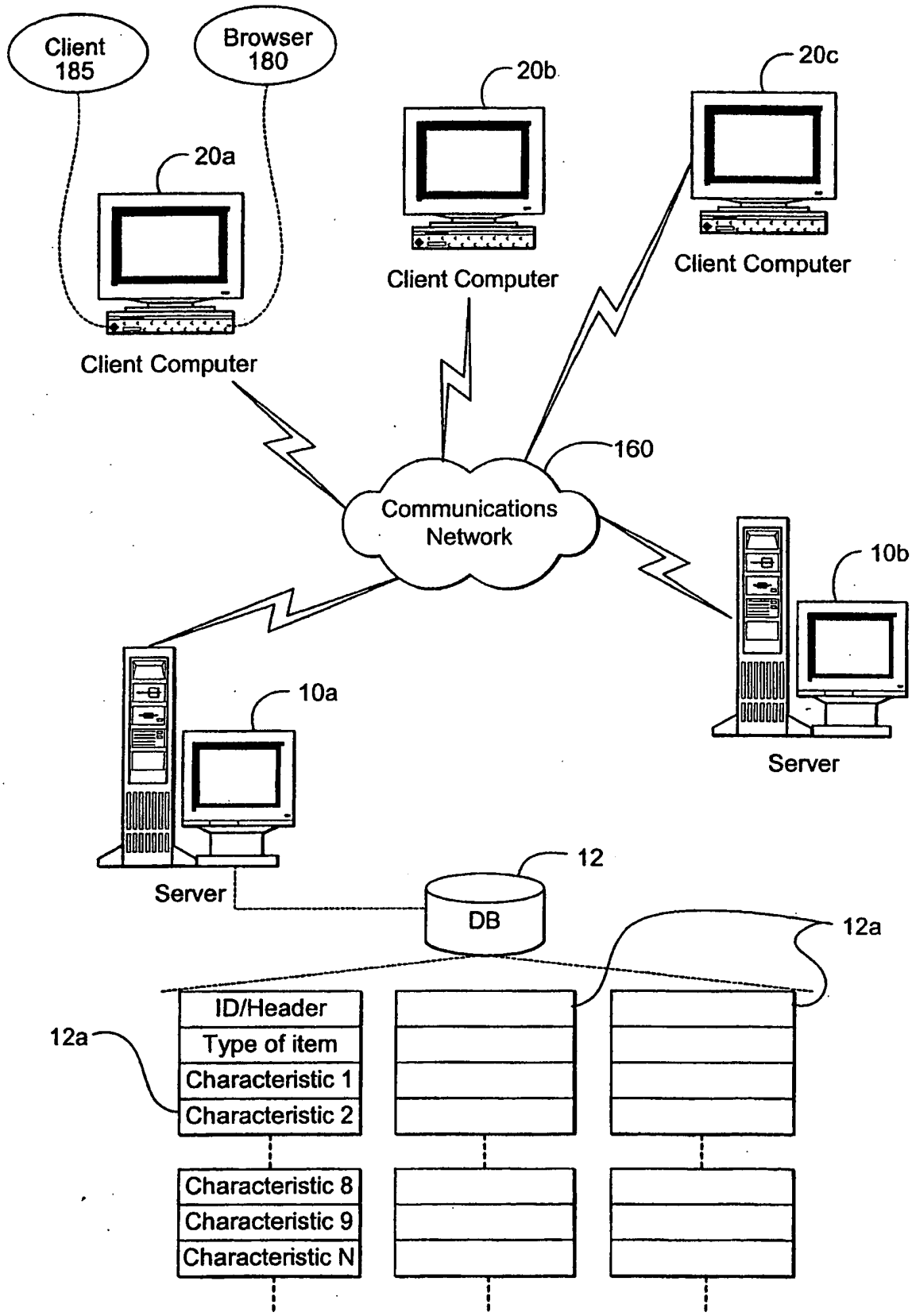

Client 185
Browser 180
20a
20b
20c
Client Computer
Client Computer
Client Computer
160
Communications Network
10b
Server
10a
Server
12
DB
12a
12a
ID/Header
Type of item
Characteristic 1
Characteristic 2
Characteristic 8
Characteristic 9
Characteristic N

FIG. 2

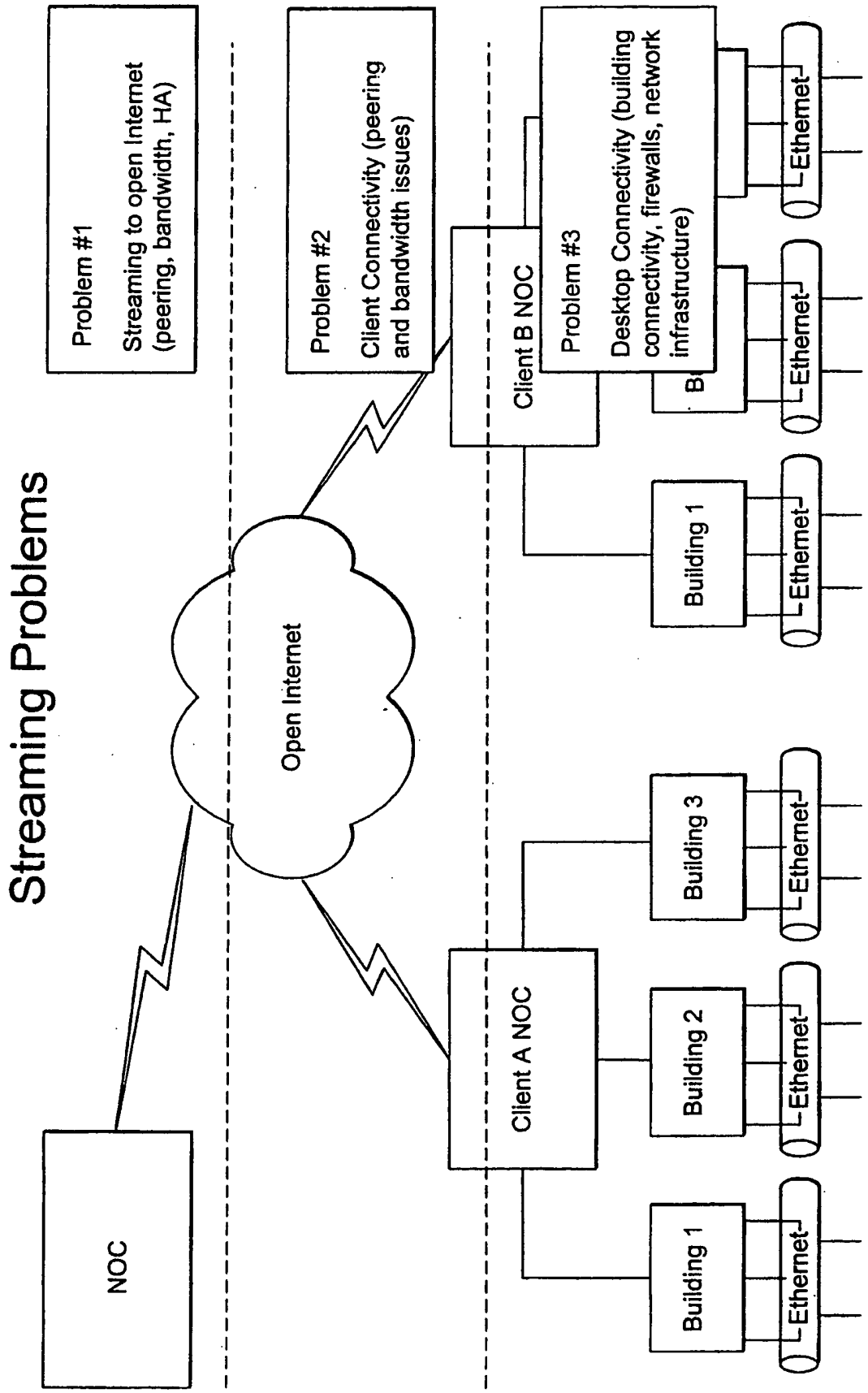

Streaming Problems
Problem #1
Streaming to open Internet (peering, bandwidth, HA)
Problem #2
Client Connectivity (peering and bandwidth issues)
Problem #3
Desktop Connectivity (building connectivity, firewalls, network infrastructure)
NOC
Open Internet
Client A NOC
Client B NOC
Building 1
Building 2
Building 3
Building 1
Ethernet
Ethernet
Ethernet
Ethernet
Ethernet

FIG. 3

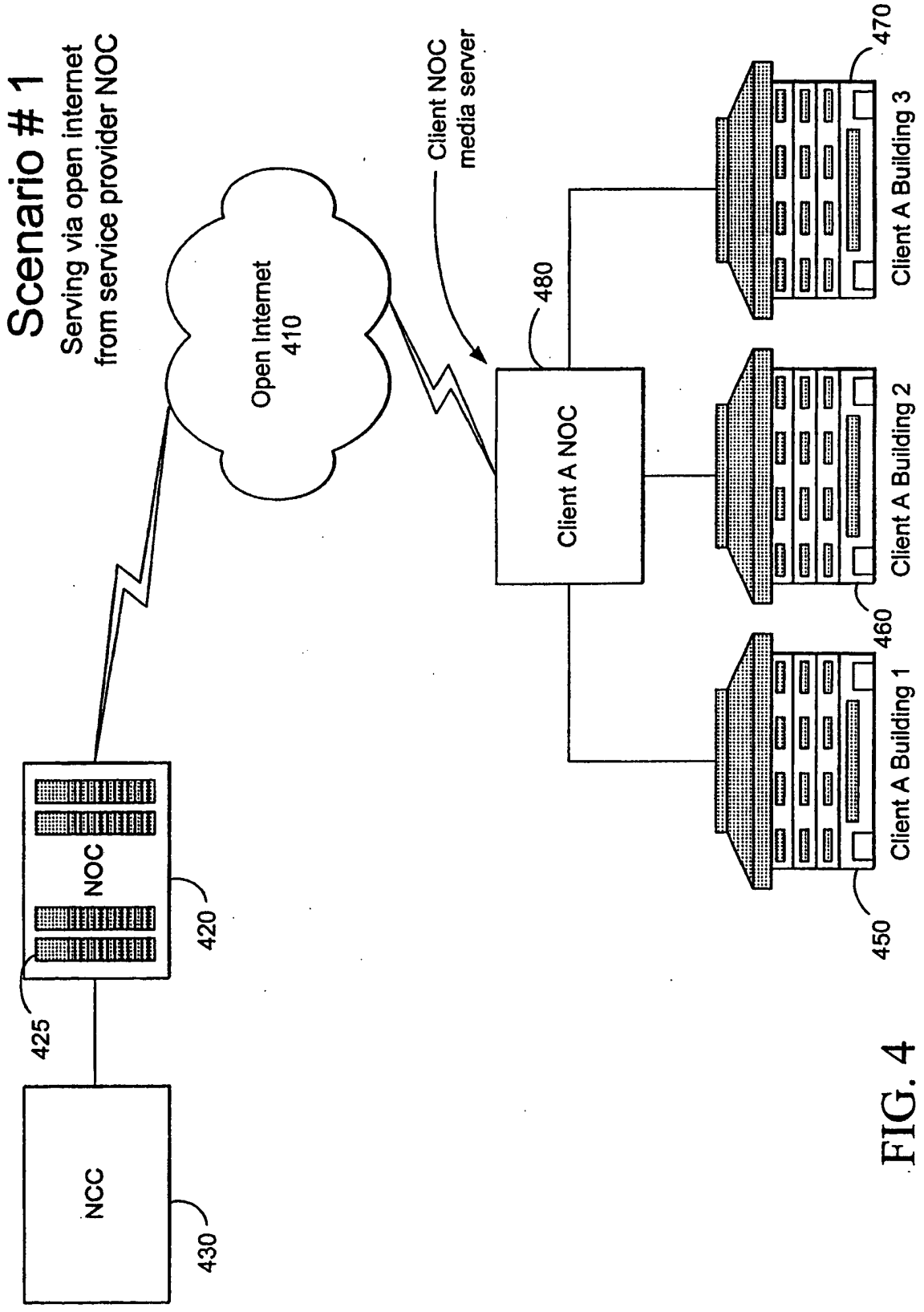

Scenario # 1
Serving via open internet
from service provider NOC
Open Internet
410
Client NOC
media server
480
Client A NOC
Client A Building 3
470
Client A Building 2
460
Client A Building 1
450
NOC
420
425
NCC
430

FIG. 4

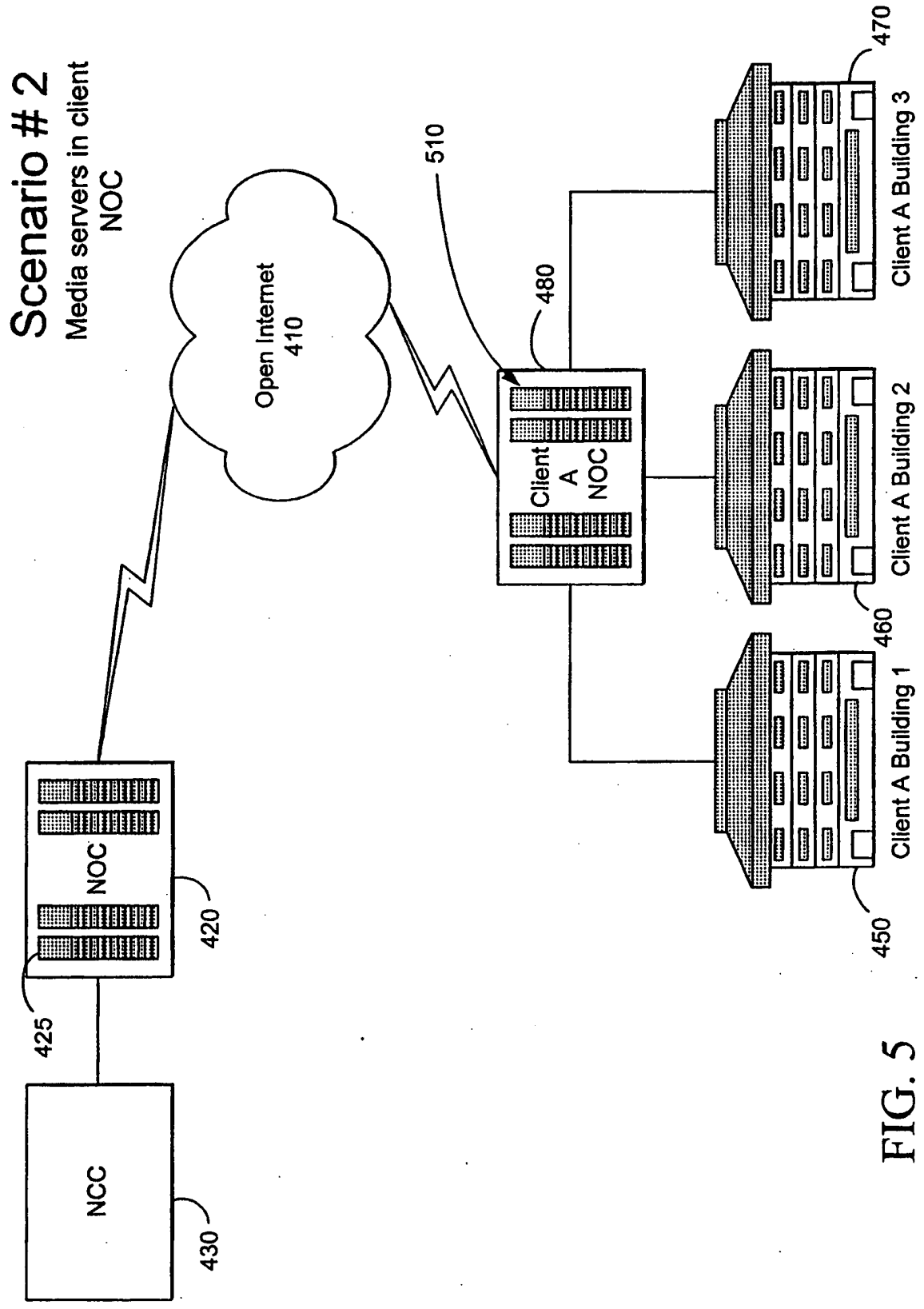

Scenario # 2
Media servers in client NOC
Open Internet 410
510
480
Client A NOC
470
Client A Building 3
Client A Building 2
460
Client A Building 1
450
NOC
420
425
NCC
430

FIG. 5

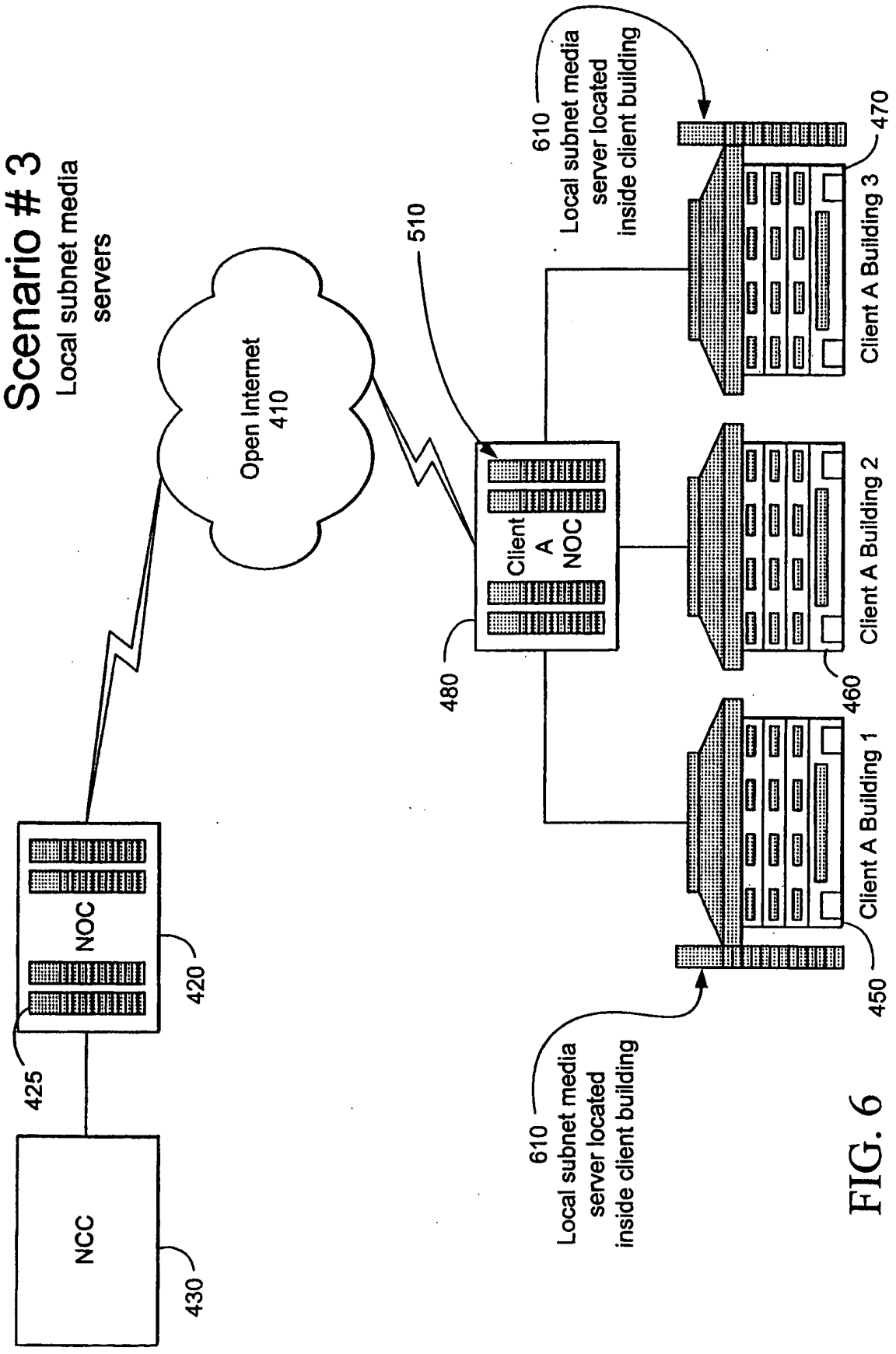
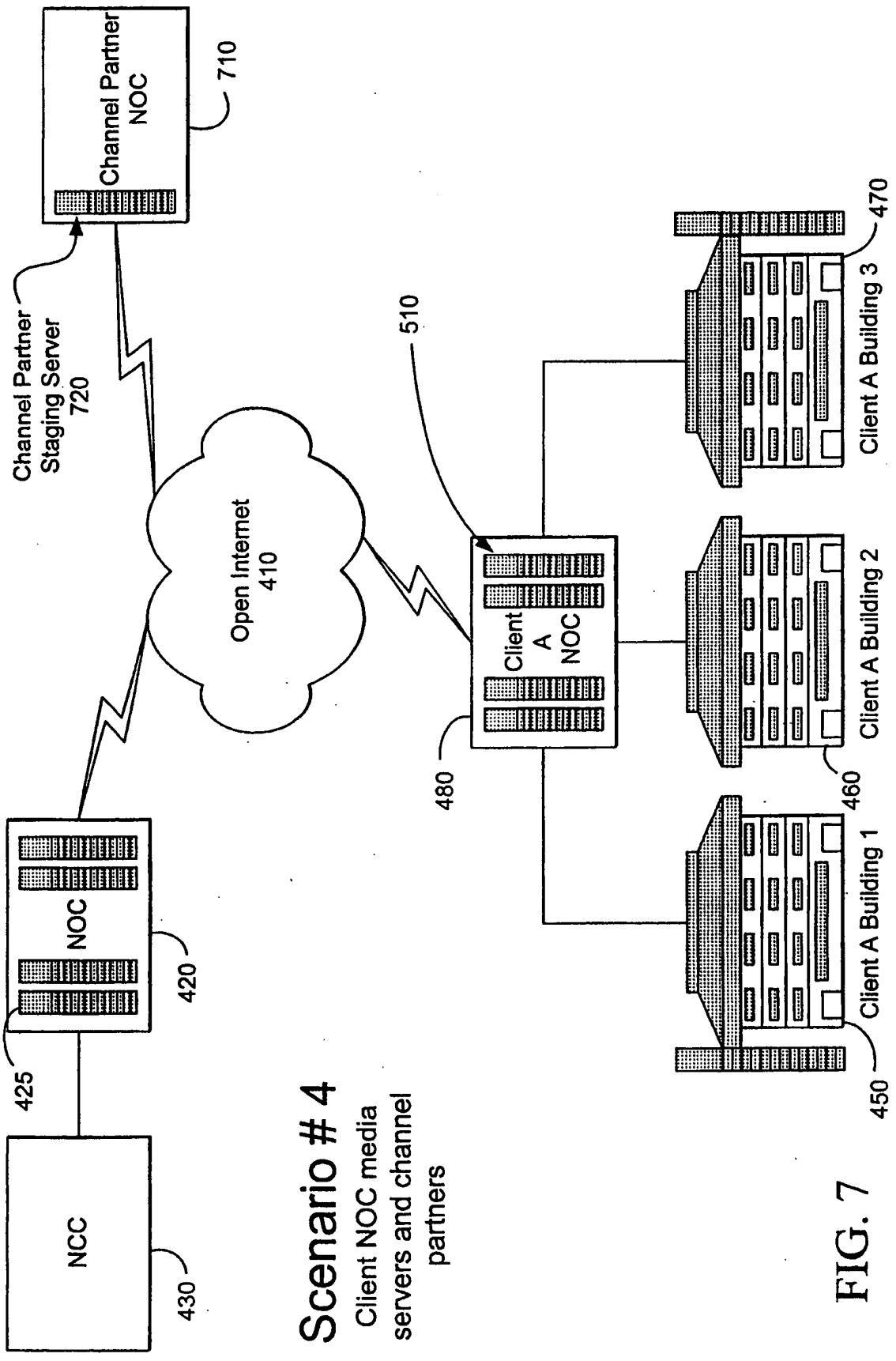

Scenario # 3
Local subnet media servers
Open Internet 410
510
NOC
420
425
NCC
430
Client A NOC
480
610
Local subnet media server located inside client building
610
Local subnet media server located inside client building
610
Local subnet media server located inside client building
Client A Building 3
470
Client A Building 2
460
Client A Building 1
450

FIG. 6



Scenario # 4

Client NOC media servers and channel partners

FIG. 7

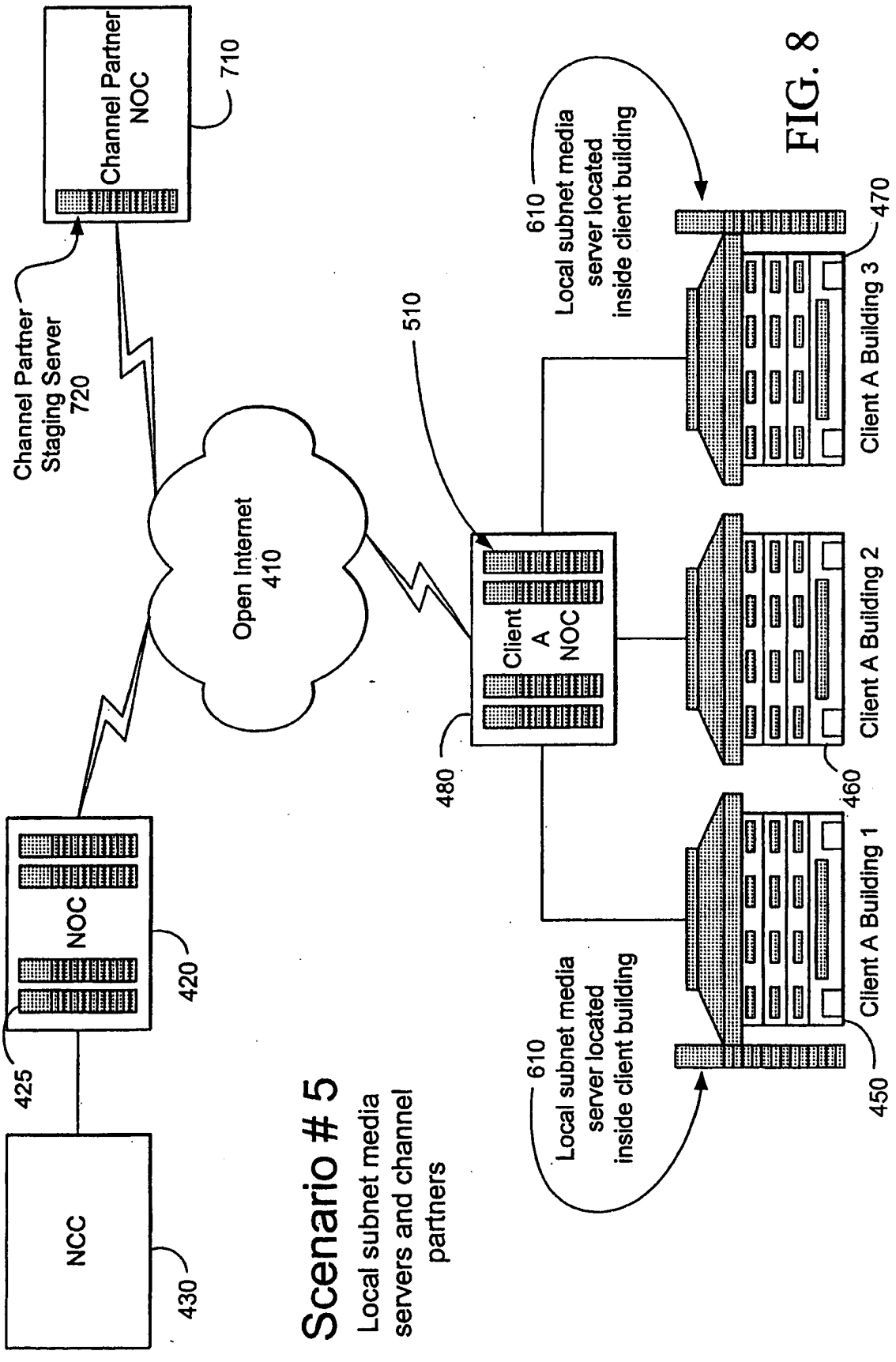

Channel Partner NOC
710
Channel Partner Staging Server 720
Open Internet 410
510
610
Local subnet media server located inside client building
Client A Building 3
470
Client A NOC
480
Client A Building 2
460
NOC
420
425
Client A Building 1
450
610
Local subnet media server located inside client building
NCC
430
Scenario # 5
Local subnet media servers and channel partners

FIG. 8

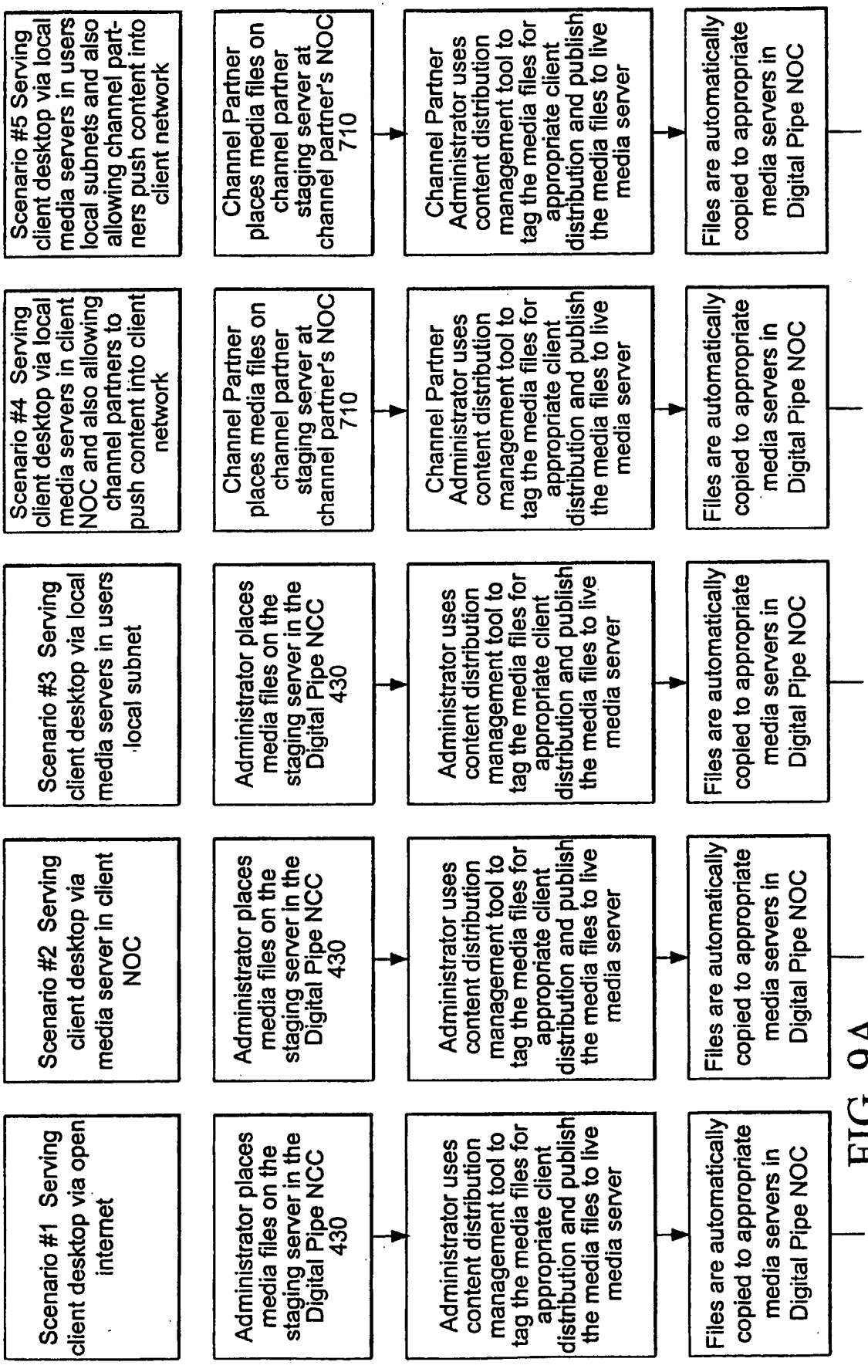

Scenario #1 Serving client desktop via open internet
Scenario #2 Serving client desktop via media server in client NOC
Scenario #3 Serving client desktop via local media servers in users local subnet
Scenario #4 Serving client desktop via local media servers in client NOC and also allowing channel partners to push content into client network
Scenario #5 Serving client desktop via local media servers in users local subnets and also allowing channel partners push content into client network
Administrator places media files on the staging server in the Digital Pipe NCC 430
Administrator uses content distribution management tool to tag the media files for appropriate client distribution and publish the media files to live media server
Files are automatically copied to appropriate media servers in Digital Pipe NOC
Channel Partner places media files on channel partner staging server at channel partner's NOC 710
Channel Partner Administrator uses content distribution management tool to tag the media files for appropriate client distribution and publish the media files to live media server

FIG. 9A

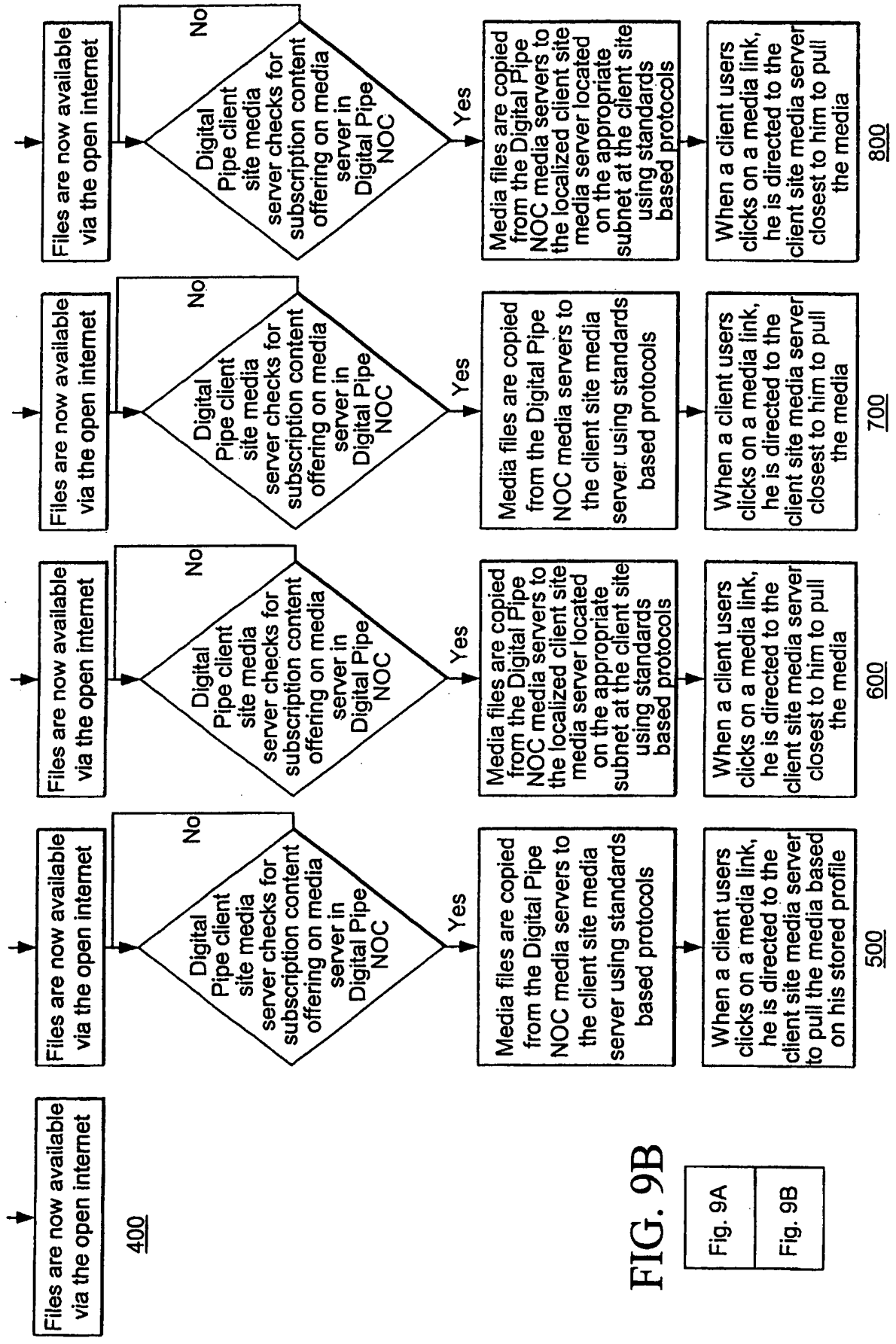


FIG. 9B

Fig. 9A
Fig. 9B

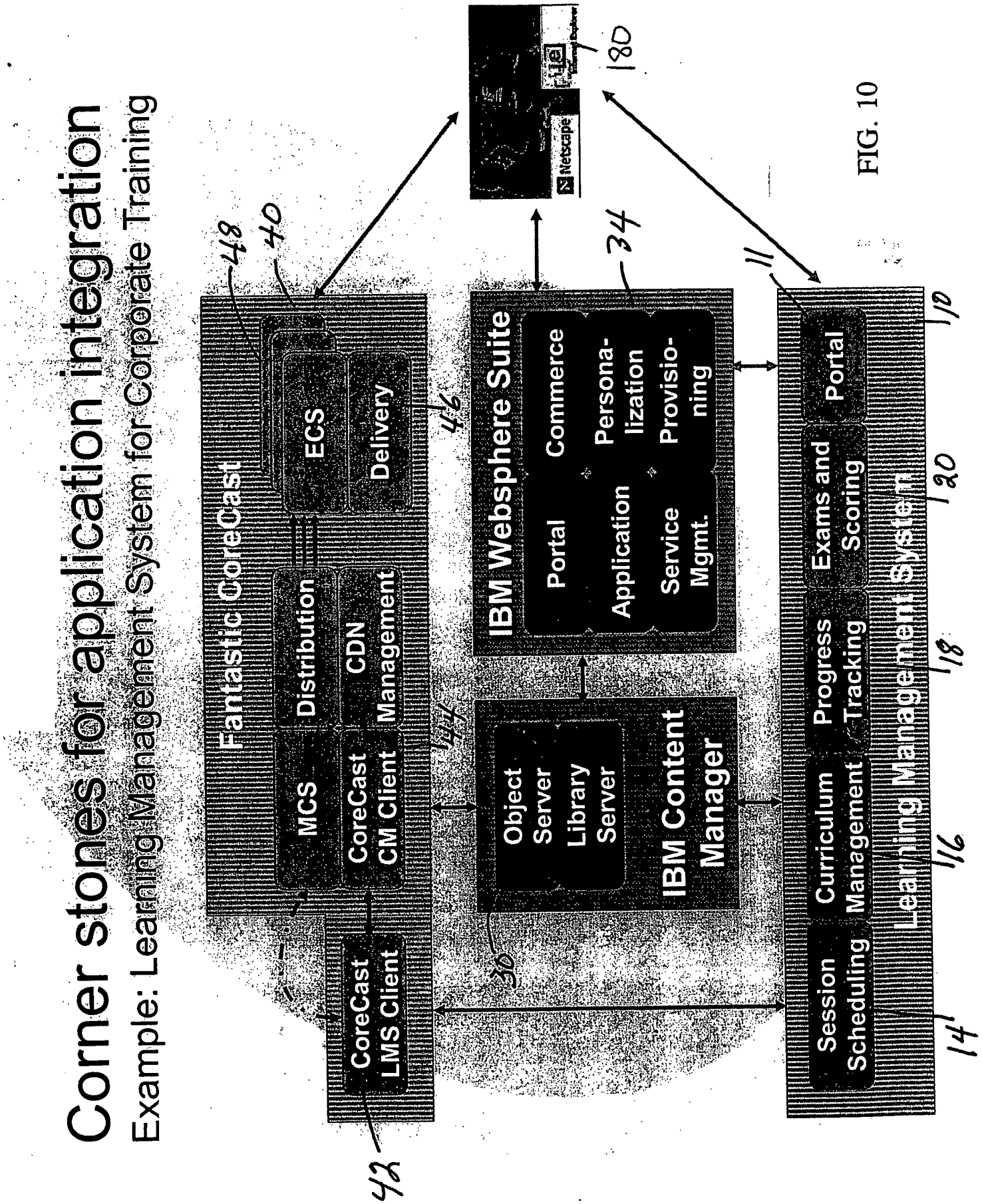
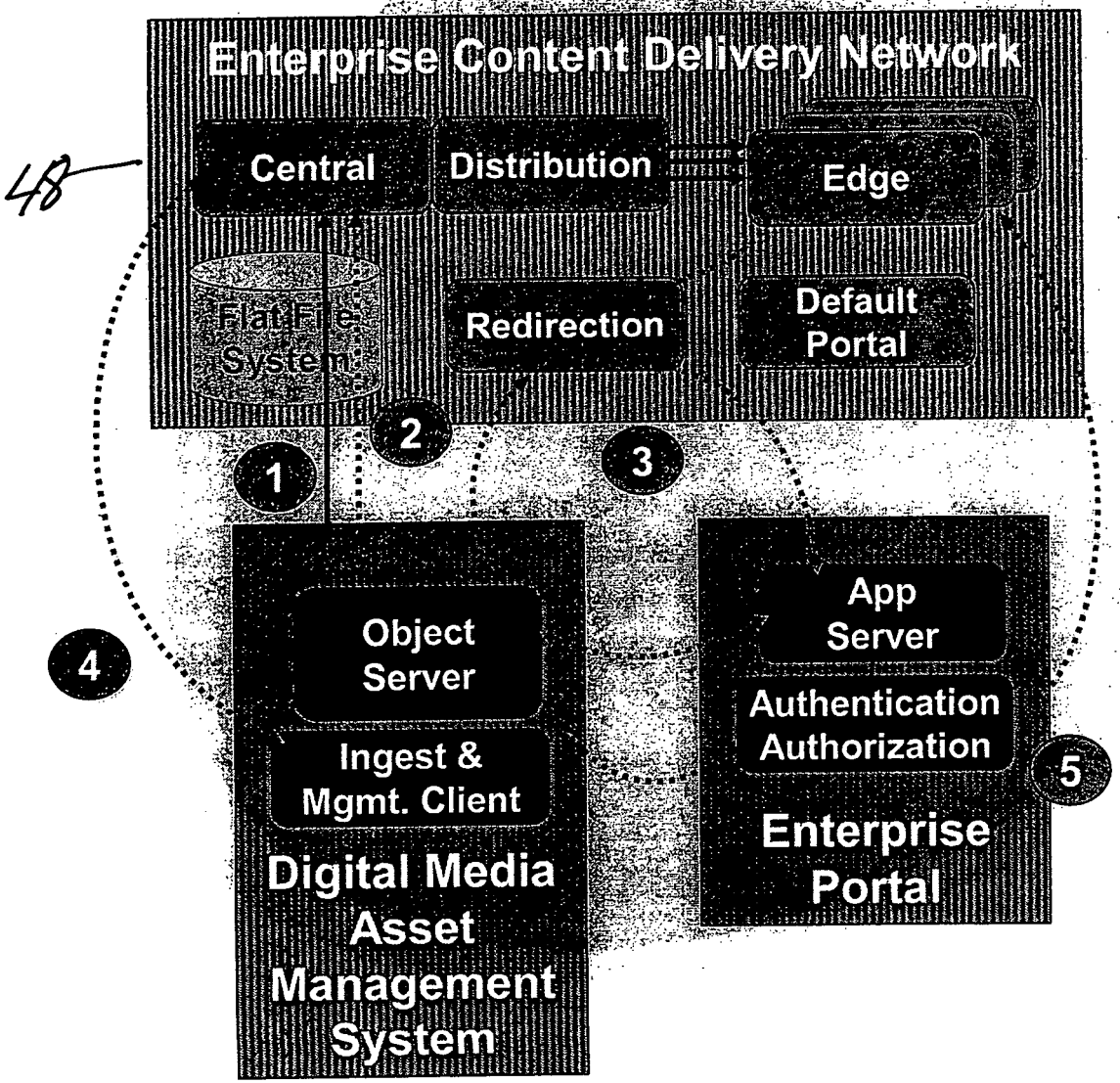

Corner stones for application integration
Example: Learning Management System for Corporate Training
Fantastic CoreCast
ECS
Distribution
Delivery
MCS
CDN Management
CoreCast CM Client
CoreCast LMS Client
IBM Websphere Suite
Portal
Commerce
Application
Persona-lization
Service Mgmt.
Provisio-ning
IBM Content Manager
Object Server
Library Server
Learning Management System
Session Scheduling
Curriculum Management
Progress Tracking
Exams and Scoring
Portal
Netscape
ie
42
48
40
44
34
180
30
14
16
18
20
10
11

FIG. 10

Integrating DMAMs with eCDNs

Options for multi-tiered solutions



1. DMAM replaces flat file system for managed asset storage
2. Metadata extraction, metadata replication and metadata-driven automation
3. Referential Integrity between DMAM and eCDN
4. Workflow integration with DMAM client for easy distribution fulfillment and metadata-driven automation
5. Integrated Authentication and Authorization for personalized services

FIG. 11

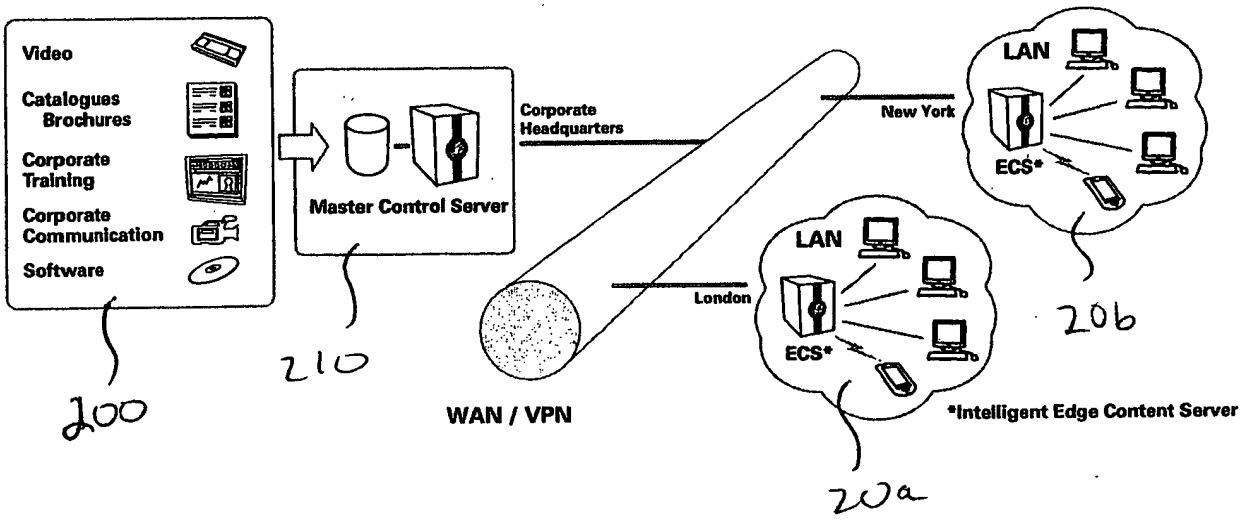

Video
Catalogues
Brochures
Corporate
Training
Corporate
Communication
Software
Master Control Server
Corporate
Headquarters
New York
LAN
ECS*
London
LAN
ECS*
WAN / VPN
*Intelligent Edge Content Server
200
210
20b
20a

FIG. 12